REMARKS

In the outstanding Official Action, claims 18-21 stand rejected under 35 U.S.C. 101 as incorporating subject matter directed to both a process and an apparatus.

Claim 12 stands rejected under 35 U.S.C. 112 as being indefinite because it lacks positive antecedent basis for the term "the enclosure".

Independent claims 1, 18 and 19 stand rejected under 35 U.S.C. 102 as being anticipated in view of the cited document U.S. Patent No. 5,860,292, *Augustine*, as do the respective dependent claims 2-3, 5-12 and 17.

The remaining dependent claims 4, 13, 14-16 and 20-21 stand rejected as obvious in view of this same reference U.S. Patent No. 5,860,292, *Augustine,* either when read alone, or when combined with the other cited art of record, U.S. Patent No. 6,182,463, *Strussion* or U.S. Patent No. 2,093,834, *Gaugler*.

Amendments have been made to claims 18 and 19 such that these claims solely recite process subject matter.

In response to the rejection under 35 U.S.C. 112, Applicant has amended claim 12 to recite the term "the evaporation chamber" which has antecedent basis.

The Applicant has studied U.S. Patent No. 5,860,292 to *Augustine* and traverses the anticipation rejection of record to claim 1 as well as claims 18 and 19 as amended and provided herewith. Specific portions of *Augustine* provide teachings which Applicant asserts do not anticipate the instantly claimed invention when read alone or in combination with the other cited art of record resulting in the person of ordinary skill in the art to arrive at the instant invention as claimed.

The Applicant traverses the rejection of the dependent claims 4, 13, 14-16 and 20-21 by now referring to specific portions of the *Augustine* reference and the other cited documents. It is asserted that *Augustine* does not render the claimed features obvious when read alone or even when this document is read in combination with the

other cited art of record such that the person of ordinary skill in the art would not arrive at Applicant's claimed features.

1. The instant invention as claimed

In the instantly claimed invention, the independent claims 1, 19 and 20 are recited herewith for the Examiner's convenience, wherein the features underlined are of some *particular relevance* to the subsequent submissions as regards the patentability of the invention as claimed.

"*1. Evaporation apparatus comprising:*

- *an evaporation chamber that is inflatable; and*
- *fluid flow control means for controlling the respective introduction and release of gas to and from the chamber to control the inflation of the chamber;*

wherein in use the inflated chamber is adapted for containing a volume of liquid in a pool at a base thereof to be evaporated and carried out of the chamber as a vapour by the gas passing across the pool."

Claims 18 and 19 each have the method step of passing a mixture of a substance and a liquid into an inflatable chamber which is adapted in use for containing a volume of liquid in a pool at a base thereof, and the step of evaporating the liquid to concentrate the substance:

"18. A process for concentrating a substance in a mixture of the substance with a liquid, the process comprising the steps of:

- *passing the mixture into an inflatable chamber to form a volume of liquid in a pool at a base thereof; and*
- *controlling the respective ingress and release of gas into and out of the chamber above the pool whereby, over time, the substance is concentrated in the liquid for subsequent collection."*

"*19. A process for concentrating a substance in a mixture of the substance with a liquid, the process comprising the steps of:*

- *passing the mixture into an inflatable chamber to form a volume of liquid in a pool at a base thereof; and*
- *causing a gas to flow across the pool of the liquid in the chamber to cause a concentration of the substance in the liquid over time.*"

Referring to the published specification of the instant application (US 2006/0081340), the main advantages of the claimed invention are:

"[0007] *In use the evaporation chamber itself advantageously acts to contain the liquid to be evaporated, and to exclude rainwater and the activity of birds and animals. As a further example, an enclosed pool of liquid provides a large liquid/gas interfacial area for evaporation. Prior art apparatus is not adapted for containing a volume of liquid in a pool, and is merely arranged for evaporative drying of bulky solid goods. The evaporation apparatus of the invention represents an improvement over prior art apparatus because, being inflatable, the chamber does not require a complex inner or exterior support structure, allowing the apparatus to be readily collapsed and moved to a new location. The collapsible chamber of the invention thus represents a simple and cost effective solution for many evaporative drying processes because, being inflatable, it is relatively easy to set up and to operate, it can contain a large volume of liquid to be evaporated, and can be made internally accessible for periodic cleaning purposes.*"

An enclosed pool of liquid within the evaporation chamber can be isolated from the surrounding groundwater. The many advantages of such an arrangement are fully explained in the published specification of the instant application (US 2006/0081340), especially in paragraphs [0058], [0059], [0060] and [0061].

One of the distinctive features of the apparatus and method of the instantly claimed invention is that it allows for the evaporation of liquid away from contaminated or toxic substances which may initially be contained in the liquid. By having a volume of liquid present in a pool in the evaporation chamber, a large interfacial evaporation area is maintained. The chamber also isolates the pool from

diluents such as rainwater or groundwater run-off, which can be a problem with open-pan evaporation systems. This also means that the evaporation process can be conducted anywhere, for example *in-situ* at a source of the contaminated liquid, such as a mine site, a farm, a wool scour operation, etc.

2. Analysis of the cited prior art US 5,860,292 (*Augustine*)

Augustine discloses an evaporative cooling system used in medical treatment to cool down the body of a patient. An inflatable thermal blanket 120 has a base sheet 200 and an upper sheet 215 which define inflatable, tubular chambers 220, for example as shown in the cross-section view shown in Figure 3 (column 6, lines 55-60).

In cross-section, the inflatable section 130 of the thermal blanket 120 appears arch-shaped. Pressurised air flows through the inflatable chambers. There are a plurality of apertures 217 that open through the base sheet 200 to exhaust pressurised air from the chambers 220 to the region underneath the blanket, to bathe the patient 100 in cooling ambient atmosphere (column 7, lines 6-9).

Fluid delivery channels or conduits 250 are mounted to the underside of the base sheet 200 (column 7, lines 28-32). The fluid conduits 250 deliver fluid to the patient 100 through a plurality of orifices 252 which are formed intermittently along the length of each conduit. These orifices may be holes, slits or be formed with outlet nozzles etc (column 7, lines 45-57).

The evaporative cooling apparatus works by blowing air from the chambers 220 downward onto the patient to evaporate liquid which is simultaneously being delivered downward onto the patient from the orifices 252 formed in the fluid conduits 250.

Augustine discloses that the fluid distribution apparatus delivers the cooling fluid by direct deposition on the skin of the patient 100. "*However, there may be times when direct application to the skin is disadvantageous. For example, if the fluid flow rate is not adequately controlled or if the contours of the patient's body allow runoff, some of the fluid can pool under the patient. This pooling of fluid is wasteful,*

messy and may be harmful to the skin laying in the pooled fluid for a prolonged time" (column 9, lines 1-7)

3. Claim rejections 35 USC 102

Applicant now summarises the differences between the instant invention as claimed in Claims 1, 18 and 19 and US 5,860,292 (*Augustine*).

Unlike the instant claimed invention, the apparatus and method disclosed in *Augustine* does not involve an inflatable chamber that is "*adapted for containing a volume of liquid in a pool at a base thereof, to be evaporated and carried out of the chamber as a vapour by the gas passing across the pool*", as claimed in Claim 1 of the instant application.

The Examiner interprets the 'evaporation chamber' to be the inflatable section 130 of the inflatable thermal blanket 120. The inflatable section 130 appears to expand to be of an arch-shaped cross-section when the tubular chambers 120 are inflated. Based on this interpretation, the inflatable chamber is not arranged to contain any liquid in a pool – firstly, there is only pressurised, flowing gas and no liquid in each of these chambers 120, and – secondly, if there was any liquid in these chambers 120, it would drain out under gravity via the plurality of apertures 217 which are located on the underside of each chamber 120.

In summary, if the inflatable section 130 of the blanket is interpreted as an 'evaporation chamber', there is no liquid in the inflatable chamber(s), no pool and therefore no gas passing across the pool.

If the 'evaporation chamber' was interpreted as the unnumbered central region of the thermal blanket 120 in which the body of the patient 100 lies, this 'chamber' is not arranged of itself to inflate because there is no restriction on gas escaping from this region – gases simply flow past the head and shoulders of the patient. Furthermore, this chamber cannot contain liquid in a pool because any liquid would drain out of the central region, simply by flowing out of the region past the head and shoulders of the patient and onto the floor. Because the body of the patient would be

a major obstruction, gas would not flow across any pool of water in this section anyway.

As is made quite clear in column 9, lines 1-7 of *Augustine*, any pooling of fluid under the patient is disadvantageous, messy and even harmful to the patient. *Augustine* positively teaches away from the idea of pooling of fluid. In summary, if the central region of the blanket is interpreted as an 'evaporation chamber', it does not inflate, there is no pool and also no gas passing across the pool.

Furthermore there is no disclosure of any method in *Augustine* which results in the concentration of a substance in a liquid over time, as is claimed in the instant Claim 18 and Claim 19. *Augustine* only discloses an evaporative chamber and method for evaporative cooling of a patient for medical reasons, and is not suitable for use in a process for concentrating a substance where that substance is initially present in a mixture of the substance with a liquid. For example, if residual solids or salts were initially present in the fluid being fed through the conduits 250, the solids would enter into the unnumbered central region of the thermal blanket 120 (in which the body of the patient 100 lies) and immediately flow out of the open end of the blanket 120 (i.e. where the head and shoulders of the patient are shown). This apparatus is simply not suitable either for containing a large volume of liquid to be evaporated, or for retaining residual solid matter.

Accordingly, for these reasons Applicant submits that claims 1, 18 and 19 are not anticipated, rathe that they recite subject matter which is patentably distinct over the prior art of record.

Applicant submits that there is no motivation for the person of ordinary skill in the art to review the teaching of *Augustine* in any way such that it would be obvious to devise the apparatus of the instant invention defined in claim 1. As stated above, *Augustine* teaches away from the concept of having a volume of liquid in a pool in the base of an inflated chamber by teaching toward an arrangement which involves the evaporation of liquid droplets on a patient body using a flow of pressurised air. In fact, *Augustine* teaches that any pooling of fluid is disadvantageous in the particular application.

It is also asserted that there would be no motivation for the person of ordinary skill in the art to review the teaching of *Augustine* and readily arrive at the methods claimed in Claim 18 or Claim 19. As already stated in relation to Claim 1, *Augustine* teaches away from the method step of passing a volume of liquid into a pool in the base of an inflated chamber by avoiding the pooling of liquid at all. The application of medical treatment patient cooling taught in *Augustine* also has nothing to do with evaporative treatment of a liquid which contains a substance. The operation of the instant invention results in the concentration of the substance from the liquid over time. This is absolutely contrary to the teaching of *Augustine*, where the last thing needed for the treatment of a sick patient is deposition of a solid or a dissolved substance on the patient. It is in no way understood why a person of ordinary skill in the art who wanted to design a method for evaporative concentration of a substance from a liquid pay any regard to a prior art method which would never involve such a step.

Applicant submits that there would be no motivation for an ordinary, non-inventive skilled person to read *Augustine* and be led to the claimed method of the instant invention. Applicant therefore asserts that, from a fair reading of the cited prior art document, the instant claims 1, 18 and 19 are non-obvious.

4. Claim rejections 35 USC 103

Applicant now addresses the obviousness rejections of the Examiner.

In the Office Action, the dependent claim 4 was said to be obvious in view of U.S. Patent No. 5,860,292, *Augustine,* when viewed in combination with U.S. Patent No. 6,182,463, *Strussion.*

In the Office Action, the Examiner rejected the dependent claims 13 as being obvious in view of U.S. Patent No. 5,860,292, *Augustine,* alone.

In the Office Action, the Examiner rejected the dependent claims 20-21 as being obvious in view of U.S. Patent No. 5,860,292, *Augustine,* alone.

In the Office Action, the dependent claims 14-16 were said to be obvious in view of U.S. Patent No. 5,860,292, *Augustine,* when viewed in combination with U.S. Patent No. 2,093,834, *Gaugler.*

The dependent claims 4, 13, 14-16 and 20-21 are recited here:

4. Apparatus as claimed in claim 3 wherein the fan is a variable speed fan.

13. Apparatus as claimed in claim 1 wherein the liquid to be evaporated can be introduced into the enclosure in a batchwise or a continuous manner via a liquid introduction port located in the exterior of the enclosure.

14. Apparatus as claimed in claim 1 wherein the vapour released from the chamber is condensed by a condenser means located external of the evaporation apparatus.

15. Apparatus as claimed in claim 14 wherein the condenser means comprises a pipe which is arranged external of the evaporation apparatus for condensing of the vapour.

16. Apparatus as claimed in claim 15 wherein the gas in the pipe can be reintroduced into the chamber.

20. A process as claimed in claim 18 wherein the liquid to be evaporated can be introduced into the inflatable chamber in a batchwise or a continuous manner.

21. A process as claimed in claim 19 wherein the liquid to be evaporated can be introduced into the inflatable chamber in a batchwise or a continuous manner.

Claim 4

The Examiner states that *Augustine* fails to teach the use of a variable speed fan in the inflatable blanket. The Examiner believes that it would be obvious to use the variable speed fan of *Strussion* in the apparatus of *Augustine*.

Augustine discloses an evaporative cooling system used in medical treatment to cool down the body of a patient. An inflatable thermal blanket 120 has inflatable, tubular chambers 220. There are a plurality of apertures 217 that open through the

base sheet 200 to exhaust pressurised air from the chambers 220 to the region underneath the blanket, to bathe the patient 100 in cooling ambient atmosphere (column 7, lines 6-9). Fluid delivery channels 250 are separately mounted under the chambers 220. The fluid conduits 250 deliver fluid to the patient 100 through a plurality of orifices 252 (such as holes or slits) which are formed intermittently along the length of each conduit. The evaporative cooling apparatus of *Augustine* works by blowing air from the chambers 220 downward onto the patient to evaporate liquid which is simultaneously being delivered downward onto the patient from the orifices 252 formed in the fluid conduits 250.

To establish whether a claim is obvious in view of a prior art document, there must be a reasonable expectation of successfully arriving at all of the features of the claimed invention without difficulty.

There is no similarity between the functionality of the separate pressurised air conduits and fluid conduits used in *Augustine* with the fluid and gas delivery system used in *Strussion*. In *Strussion*, the variable speed fan 22 operates to blow air and water (delivered from misting nozzles 26). "*The nozzles 26 inject or distribute the water preferably in the form of fine water droplets, and even more preferably in the form of a mist, into the air flow path generated by the fan 22, which causes the water to intermix with the air. The resulting mixture is a substantially evaporated air/water mixture that, when discharged from the cooling apparatus 10, cools an area of a subject in the flow path*" (column 4, line 62 to column 5, line 2). In other words, the apparatus of *Strussion* is arranged to create a combined, pressurised water/air mixture immediately after the fan 22, whereas the apparatus of *Augustine* drips water onto the patient and separately blows air from the chambers 220 downward onto the patient, causing the water to be evaporated and to cool the patient. It is difficult to see how the apparatus of *Strussion* could achieve this when it constantly feeds mist onto a patient.

Augustine and *Strussion* are so divergent from one another that the person of ordinary skill in the art would not be motivated to combine the features disclosed in each, to develop the device set forth and claimed by the Applicant in claim 4.

Applicant therefore asserts that, from a fair reading of the cited prior art documents, the instant claim 4 is non-obvious.

Claims 13, 20, 21

The Examiner believes that it would be obvious to introduce the liquid to be evaporated into the inflatable chamber in a batchwise or in a continuous manner in the apparatus of *Augustine*.

Applicant submits that if the liquid is not inserted continuously into the apparatus of *Augustine* via the fluid conduits 250, then a point could be reached when all of the liquid on the patient body would become evaporated by the flow of air from the chambers 220 downward onto the patient. This would mean that the patient would stop being cooled. Batchwise delivery of liquid into the apparatus of *Augustine* is therefore a very unlikely mode of operation.

Instead, continuous mode delivery of fluid in *Augustine* is practiced to ensure that fluid is available for evaporation with minimal monitoring, for example:

"*Optionally, an incorporated liquid sensing device could be used to determine and control the rate of delivery of the fluid for evaporation. The fluid distribution apparatus thus allows fluid to be distributed and delivered to desired portions of the patient's body, at a controlled rate, over a prolonged period of time, without requiring the inflatable thermal blanket to be lifted or frequent operator involvement.*" (column 10, lines 5-12).

Consequently, because the instant invention can be operated in either batch or continuous mode, there is a considerable advantage over the apparatus and method disclosed by *Augustine*. *Augustine* teaches away from batch mode operation. The person of ordinary skill in the art would not be motivated to develop the apparatus and methods set forth and claimed by the Applicant in claims 13, 20 and 21.

Applicant therefore asserts that, from a fair reading of the cited prior art documents, the instant claims 13, 20 and 21 are non-obvious.

Claim 14-16

The Examiner states that *Augustine* fails to teach the use of a condenser means located external of the evaporation apparatus. The Examiner believes that it would be obvious to use the condenser means of *Gaugler* in the apparatus of *Augustine*.

Applicant submits that the condenser of *Gaugler* is for liquefaction of refrigerant gas. This is a complex piece of machinery, which is electrically powered and part of a closed-circuit refrigeration unit. By contrast, there is no condenser used in the apparatus of *Augustine* nor would there ever need to be. The point of the apparatus and method of *Augustine* is that the water droplets are evaporated so as to cool a patient body, and then simply passed into the atmosphere. *Augustine* does not use refrigerant gases or complex cooling technologies.

To establish whether a claim is obvious in view of a prior art document, there must be a reasonable expectation of successfully arriving at all of the features of the claimed invention without difficulty.

Augustine and *Gaugler* are so divergent from one another that the person of ordinary skill in the art would not be motivated to combine the features disclosed in each, to develop the device set forth and claimed by the Applicant in claims 14-16.

Applicant therefore asserts that, from a fair reading of the cited prior art documents, the instant claims 14-16 are non-obvious.

In view of all of the aforesaid, it is submitted that Applicant's invention as claimed is neither anticipated nor obvious in view of the reference of record. Favorable reconsideration of the issuance of an early Notice of Allowance is earnestly solicited.

Respectfully Submitted,

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Date: January 17, 2007

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